Primary Problem/Objective Statement

System Vulnerability

Problem

Levees were first constructed in the Sacramento-San Joaquin Delta during the late 1800s, when settlers began to turn tidal marshes into agricultural land. Over time, both natural settling of the levees and subsidence (oxidation and consolidation which lowers the level of the land over time) of Delta island soils resulted in a need to increase levee heights to maintain protection. There is a growing concern about the vulnerability of the Delta levees to natural disasters. Failure of Delta levees can result in flooding of Delta island farmland in addition to a loss of habitat for wildlife and a loss of wintering grounds for migrating species. Long-term loss of an island or tract can expose adjacent islands to increased wave action and possible levee erosion. Levee failure on specific islands can have impacts on water supply distribution systems such as the Mokelumne Aqueduct. Similarly, flooding of key Delta islands can increase the potential for sea water intrusion further up the Delta, especially in a low water year when less freshwater would be available to repel the incoming salt water. Such a failure could result in a lengthy delay to in-Delta and export use of Delta water by both urban and agricultural users.

Local reclamation districts are concerned with the cost of maintaining and improving the levee and channel system. The complex array of agencies with planning, regulatory, and/or permitting authorities over levees makes rehabilitation and maintenance efforts difficult. Regulatory measures which protect endangered species or critical habitat sometimes conflicts with and prolongs levee rehabilitation and maintenance work, which can further increase the vulnerability of the system.

Objective

The primary program objective for addressing Bay-Delta system vulnerability is to reduce the conflict between the long-term productivity of the system functions and ecosystem, water supply, and water quality functions of the system. The vulnerability of the land use/economic activity, infrastructure for water supply conveyance, water quality, and aquatic/terrestrial habitat protection functions of the Bay-Delta system to both general failure and sudden catastrophic failure can be reduced by implementing an integrated and comprehensive program for Delta levees and channels. This plan would need to streamline and consolidate the planning, regulatory, and permitting processes which affect the system, and provide a stable and constant funding source for system maintenance and rehabilitation. By reducing the conflict between protection of endangered species/habitat and levee maintenance activities, the risk to the Bay-Delta system posed by potential levee failure can be managed to reduce the vulnerability of Bay-Delta functions.

Linkages

A critical issue which affects the vulnerability of the Bay-Delta system is impact of levee maintenance and stabilization activities on the ecosystem, especially with respect to endangered species and the riparian and aquatic habitat which supports these species. In many cases, benefits to both the system vulnerability and the riparian and aquatic habitats contained on or in the levees and channels which make up the system, can be achieved by incorporating habitat restoration and protection elements in the levee system stabilization actions. Conversely, the same observation is true of riverine and riparian enhancements in the Delta. A second critical linkage can be in the resolution of conflict between some island land surface subsidence, which can occur in Delta island peat soils when subjected to some farming practices, and efforts to provide long-term stability of levees. Both the Delta ecosystem (including the aquatic habitat and the terrestrial habitat found on the levees and inside the islands) and system stability can benefit from reducing land surface subsidence adjacent to the levees. Such synergism can be implemented both where levee

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stabilization is proposed and where habitat enhancement (riverine and riparian) is proposed. One method to accomplish this, the creation of shallow wetlands adjacent to the landside toe of the levee, also serves to enhance habitat. However, special design and implementation techniques need to be employed where Delta islands are well below sea level as more traditional techniques employing set back levees and breaching of existing levees will not produce the desired shallow wetland habitat.